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SHORT REPORT

Lymphedema after Greater Saphenous Vein Surgery

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Abstract Three patients presented with swollen leg after surgical removal of the greater saphenous vein (GSV): two of them after stripping of the GSV for varicosity and one after harvesting the GSV for coronary artery bypass graft (CABG) surgery. Lymphoscintigraphic examination of the affected leg revealed an impaired lymphatic drainage. Two of the subjects showed an impaired lymphatic drainage in both the legs, suggesting a pre-existing dysplastic lymphatic system. We discuss and review the cause of lymphedema after venous surgery.

Ligation of the saphenofemoral junction (SFJ) and stripping of the greater saphenous vein (GSV) are considered the standard therapy for primary varicose veins caused by GSV incompetence.[1] Another reason for the surgical removal of GSV is its need as a graft in coronary artery bypass graft (CABG) surgery.

Possible complications of these procedures are postoperative pain and bruising, wound breakdown and prolonged sick leave. Occasionally, complications such as bleeding, infection, phlebitis and nerve damage can occur.[2]

We report on three patients who developed lymphedema, a rarely observed complication following surgical removal of GSV.

Case Reports

Three female patients presented with unilateral pain and swelling of a leg. In patients A (aged 60 years) and B (aged

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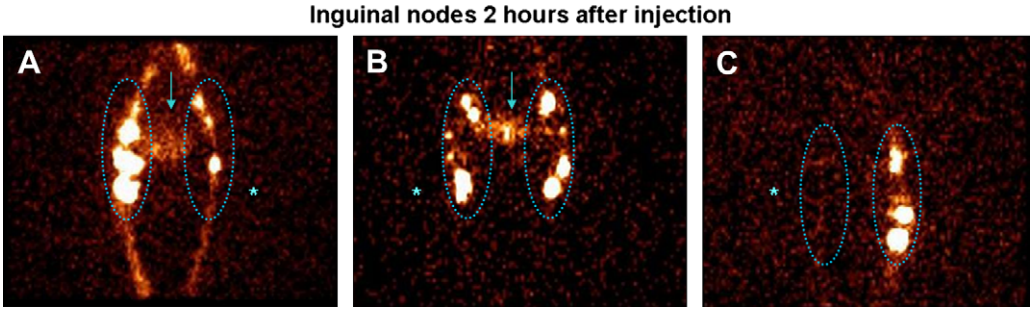

Figure 1 Lymphoscintigraphic evaluation in patients A, B and C. The asterix (*) indicates the operated leg, the arrow (↓) points to the bladder. The panel shows radioactivity in the inguinal nodes 2 h after injection. In patient A, the uptake was normal on the right side (14%) and diminished on the left (operated) side (1.7%). Patient B had diminished uptake bilaterally, left 2.5%, and right 2.0%. Patient C also had bilaterally diminished uptake, left 4.4% and right 0.3%.

49 years), these symptoms developed within 1 year after treatment for varicosis with ligation of the SFJ and short stripping of the GSV. Patient C (aged 62 years) developed swelling after the distal part of her right GSV had been harvested for CABG surgery 1 year earlier. The medical history of these patients did not include deep venous thrombosis, erysipelas, previous radiotherapy or other surgical procedures.

On examination, pitting and non-pitting oedema of the leg, foot and toes were seen in the previously operated leg. Stemmer's sign (criterion for lymphedema) was positive. The contralateral leg showed no oedema.

Venous duplex ultrasonography showed no abnormalities, and other causes of oedema were excluded. Lymphoscintigraphy characterised impaired lymphatic drainage in all three patients by demonstrating a decreased percentage of technetium^{99m} labelled nanocolloid transported from its injection site (the foot) to the inguinal nodes. The uptake is normally >10% of the injected dose in the inguinal nodes on each side. Patient A, operated on the left leg, showed 14% in the right groin and 1.7% in the left (Fig. 1). Lymphoscintigraphic evaluation in patients B and C revealed insufficient lymphatic drainage in both legs. In patient B, the uptake in the left groin was 2.5% and in the right groin 2.0%. In patient C, the uptake in the left groin was 4.4% and in the right groin 0.3%.

Based on these findings, in patient A, we diagnosed lymphedema in the left leg due to interruption of lymphatic tissue caused by the previously performed surgical procedure. In patients B and C, it is most likely that the surgical procedures caused decompensation of a pre-existent underdeveloped lymphatic system, as the contralateral leg also revealed a disturbed lymphatic drainage.

Discussion

Lymphedema is an abnormal accumulation of interstitial protein-rich fluid. Insufficient transport and drainage of lymph result in swelling of the respective body part.[3] Lymphedema can be classified as resulting from primary or secondary causes. Primary lymphedema arises from a genetically determined developmental defect of the lymphatic system, which can be hereditary.[3] This presents itself at any age, either spontaneously or triggered by an exogenous event (i.e., surgery). Secondary lymphedema is caused exclusively by an exogenous event. In Western countries, surgical treatment of breast cancer is the most common cause of secondary lymphedema.[3]

There are no reports in the literature concerning lymphedema as a complication after GSV surgery. The most commonly reported lymphatic complications following saphenofemoral surgery are lymphatic fistula and lymphocoele.[4] Only a few cases of lymphedema following ligation of the SFJ and stripping of the GSV have been reported.[4] Lymphedema in these cases was caused by disruption of the large lymph vessels.[5] The superficial inguinal lymph nodes and large lymph vessels accompany the GSV anatomically.[5] For that reason lymph vessels are prone to damage during surgery of the GSV.

We would suggest that lymphedema can be a complication of GSV surgery, particularly in subjects with a pre-existent underdeveloped lymphatic system (patients B and C in this report). The low incidence of primary lymphedema makes it unrealistic to systematically screen all patients for a pre-existent underdeveloped lymphatic system prior to surgical procedures. Only if there are clear indications of a pre-existent underdeveloped lymphatic system, that is, a positive family history of primary lymphedema, would we suggest a thorough clinical evaluation of the extremity, and on indication a lymphoscintigraphy before performing a surgical procedure. If a poor lymphatic drainage exists, we advise against GSV surgery. Newer endovenous techniques, that is, endovenous laser therapy, theoretically have a lesser risk of causing lymphedema.

Conflict of Interest Statement

None.

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